19. (Currently Amended) The method as recited in claim 14, wherein the model is subject to the conditions of:

$C_{regional}(\theta) \leq N_{channels}$;

$D_{regional}(\theta) \leq N_{segments}$;

$\theta_i^R, + \theta_i^P +, \theta_i^r = 1$, $i = 1,2,..., n$; and

$\theta_i^R, \theta_i^P, \theta_i^r \in \{0,1\}$, $i = 1,2,...,n$,

wherein:

i is the media program;

$D_{regional}$ defines storage needed at each regional server;

θ_i^R has a value of 1 if the media program is stored only at the remote server, and has a value of 0 if the media program is not stored at the remote server;

θ_i^P has a value of 1 if the prefix is stored at the regional server, and has a value of 0 if the prefix is not stored at the regional server;

θ_i^r has a value of 1 if the entire media file is stored regionally, and has a value of 0 if the entire media file is not stored regionally;

$N_{channels}$ is a maximum number of channels at each regional storage location; and $N_{segments}$ is a storage capacity at each regional server.

20. (New) The method as recited in claim 12, wherein the prefix and suffix are determined so as to reduce costs associated with transmitting the media file to the plurality of clients.

REMARKS

Entry of the above amendments is respectfully requested. Claims 1-19 were originally pending. Claims 1, 11, 12, 14, and 19 have been amended. New claim 20 has been added. Claims 1-20 are now pending in the application. Favorable reconsideration and allowance of this application is respectfully requested in light of the foregoing amendments and the remarks which follow.

I. Drawings

The drawings are objected to under 37 CFR 1.83(a) requiring that the drawings show every feature of the invention specified in the claims. Specifically, the Office Action requires

that the claimed invention in independent claims 1, 12 and 14 including all aspects of the invention be shown or the feature(s) cancelled from the claims.

However, the Office Action fails to identify with any specificity those features of the claims alleged to not be shown in the drawings. Rather, the Office Action states that Fig. 6 merely shows a plurality of regional servers/storages connected to a central server. However, Applicant directs the Examiner to Fig. 1 illustrating a plurality of consumer receivers 30-30'', remote server 48a, and a regional server 48b. Fig. 6 further illustrates that a plurality of regional servers 48b-f in communication with the remote server 48a. Furthermore, Fig. 4 is a graphical representation of a skyscraper delivery system in accordance with the preferred embodiment showing different channels on the vertical axis and time on the horizontal axis and further showing the breaking up of a continuous media program into multiple segments broken up into a prefix and a suffix.

Applicant therefore asserts that every feature of claims 1, 12, and 14 are shown in the drawings, and that no amendments are necessary to the claims or drawings in order to overcome the outstanding objection to the drawings. Withdrawal of the objection to the drawings is therefore respectfully requested.

II. Claim Rejections under 35 USC § 102

A. Summary of Prior Art

Prior to addressing the individual claim rejections, Applicant believes that an overview of Nussbaumer will assist the Examiner when reconsidering the present application.

1. Nussbaumer

Nussbaumer discloses an interactive video on demand (IVOD) system and recognizes that trade-offs exist between the costs associated with bandwidth and storage (Page 779, right column, lines 3-15). Nussbaumer further approximates the costs associated with data transmission costs and storage costs (Page 780, Section B-Page 782, left column). Nussbaumer furthermore provides a system for broadcasting video at Page 784, right column, Section VI, as will now be described.

Up to Section VI, Nussbaumer considered the location of the sources and caches of the entire programs (See Page 784, Section VI, first sentence). Accordingly, up to Section VI, Nussbaumer does not teach or suggest caching prefixes and suffixes as recited in the pending claims.

In Section VI, Nussbaumer provides a remote server that stores an entire program to be transmitted. Nussbaumer further provides a regional server capable of caching windows (small portions) of the program broadcast from the remote server.

Nussbaumer's system is dependent upon a first client requesting a video, and a second client subsequently requesting the same video. For instance, if client 1 requests transmission of a video at time T_0, data begins streaming to client 1 from the remote server. The data from the remote server is also cached at the regional server when a client 2 requests transmission at a time T_1 so long as the expiration of time between T_0 and T_1 is no greater than the capacity in the regional cache.

For instance, if the cache stores six minutes of data, and client 2 requests the data after the expiration of two minutes from client 1's request, the regional server will begin caching minute three and subsequent minutes within its window from the data transmitted from the remote server for client 1. At the same time, the remote server will broadcast minutes 1 and 2 to client 2. Accordingly, once client 2 has finished receiving minute 2 from the remote server, client 2 will then receive minutes 3 and subsequent minutes from the regional cache. It should be noted that the regional cache will not store minute 3 through the end of the program, but will rather store a rolling window of data (e.g., minutes 3-9, then 4-10, then 5-11, etc...).

However, if client 3 requests data at a time after client 1 such that the length of time between client 1's request and client 3's request is greater than the length of available storage time at the regional server (e.g., more than six minutes), a new stream from the remote server will be originated for client 3. The new remote stream will be stored in a new regional server cache when a subsequent client request is received, assuming that the subsequent client request falls within the predetermined period of time after client 3's request..

As a result, the remote server is not required to transmit full video programs to multiple clients that can receive data from a common regional cache. Furthermore, because the regional server only caches a relatively small amount of data (e.g., six minutes), storage cost savings are also achieved.

It is thus clear that in Nussbaumer, the remote server 1) transmits the entire video to a first client, and 2) transmits a prefix of the video to qualifying subsequent clients. Furthermore, in Nussbaumer, the regional server transmits a second portion of the program, or suffix, (e.g., minutes 3 etc...) to the subsequent clients. The regional server does not transmit a first part of the program, or prefix.

Nussbaumer furthermore does not divide a video into a prefix and a suffix as a function of either storage costs or transmission costs. Rather, Nussbaumer divides the video

into a prefix and suffix dependent upon when the subsequent client requests transmission. For instance, if client 2 requests data two minutes after client 1, then the prefix transmitted from the remote server will have a duration of two minutes. If client 2 requests data five minutes after client 1, then the prefix will have a duration of five minutes.

B. Discussion of Prior Art Rejections under 35 USC 102

The Office Action rejects claims 1 and 10-14 as being anticipated by Nussbaumer. Claims 1, 12, and 14 are the only independent claims originally pending in the application, and will be discussed in-turn below.

1. Independent claim 1

Claim 1 recites a method for improving an efficiency of transmitting a continuous media program on-demand to multiple consumers in response to a plurality of consumer requests. The media program is transmitted from at least one regional storage location serving a corresponding plurality of consumers and a remote storage location in communication with the at least one regional storage location. Several of the steps recited in claim 1 are neither taught nor suggested by Nussbaumer.

For instance, the method includes splitting the program into a prefix and a suffix as a function of at least 1) costs associated with storing the prefix at the at least one regional storage location and 2) costs of transmitting the suffix from the remote storage location. As discussed above, Nussbaumer fails to teach or suggest splitting a program into a prefix and suffix as a function of either storage costs at the regional server or transmission costs at the remote server. Rather, Nussbaumer splits the program into a prefix and suffix as a function of when a subsequent client requests video data.

The claimed method further includes storing the prefix at the at least one regional storage location, and storing the suffix at the remote storage location. Nussbaumer fails to teach or suggest this step as well. Specifically, Nussbaumer does not teach or suggest storing a prefix at the remote server. Rather, the prefix is broadcast from the remote server, such that the suffix is stored at the regional server.

The claimed method further includes the steps of (d) transmitting the prefix to the plurality of consumers from the corresponding at least one regional storage location, and (e) transmitting the suffix to the plurality of consumers from the remote storage location. Nussbaumer again fails to teach or suggest these steps and, in fact, teaches the opposite. Specifically, Nussbaumer teaches that the prefix is transmitted from the remote storage location to a plurality of consumers that request data within a predetermined window of time.

Nussbaumer further teaches that the suffix is transmitted to the plurality of customers from the regional cache.

The presently claimed invention further achieves advantages not recognized by Nussbaumer. For instance, the prefix and suffix are split such that the costs of storing and transmitting data can be optimized to reduce the cost for video delivery on demand to all consumers. Nussbaumer fails to achieve this advantage, as splitting of the video into a prefix and suffix is dependent upon when clients request data. Accordingly, some transmissions will have higher cost efficiency than others.

Because Nussbaumer fails to teach or suggest each element of independent claim 1, and because claim 1 achieves advantages not attainable in Nussbaumer, Applicant asserts that claim 1 and corresponding dependent claims 10-11 are allowable over the cited prior art.

2. Independent claim 12

Independent claim 12 is a method claim that presents similarities to claim 1. For instance, claim 12 recites splitting a media file into a prefix and suffix, storing the prefix at a regional storage location, storing the suffix at a remote storage location, transmitting the prefix to a plurality of clients from the regional storage location, and transmitting the suffix to the plurality of clients from the remote storage location. As discussed above with reference to independent claim 1, Nussbaumer fails to teach or suggest these steps.

Independent claim 12 further recites that the media file is split into a fixed prefix and a fixed suffix. Claim 12 recognizes that a program can be split into a fixed prefix and a fixed suffix, which enables transmission and storage costs to be reduced for all client requests. Nusbaumer, on the contrary, fails to teach or suggest splitting a program into a fixed prefix and suffix. Rather, as discussed above, the prefixes and suffixes will differ from client-to-client depending upon when the client requests date. For instance, if client 2 requests data two minutes after client 1, then the prefix transmitted from the remote server will have a duration of two minutes. If client 2 requests data five minutes after client 1, then the prefix will have a duration of five minutes. Nussbaumer is therefore incapable of achieving the cost savings that can be realized with the invention recited in claim 12.

Applicant therefore asserts that independent claim 12 and corresponding dependent claim 13 are allowable over the cited prior art.

3. Independent claim 14

Independent claim 14 recites a method similar to claim 1, but is directed to transmitting a plurality of continuous media programs on demand to multiple customers.

Accordingly, the distinctions noted above between Nussbaumer and claim 1 are also generally applicable to claim 14. It is furthermore noted that Nussbaumer fails to teach or suggest storing a plurality of suffixes at the regional server and, in fact, teaches against storing multiple prefixes at the regional server due to the limited storage capacity (e.g., six minutes) achieved at the regional server.

Applicant therefore asserts that independent claim 14 is allowable over the cited prior art.

4. Conclusion with Respect to 102 Rejections

Based on the above, Applicant asserts that Nussbaumer fails to anticipate or render obvious any of claims 1 and 10-14. Withdrawal of the rejection is therefore respectfully requested.

III. Claim Rejections under 35 USC § 103

1. Claim 6

Claim 6 is rejected under 35 USC 103(a) as being unpatentable over Nussbaumer in view of Eager, et al.

Claim 6 depends from claim 1, which is shown to be allowable, as discussed below.

Furthermore, Applicant notes that the Eager reference is dated less than one year prior to the filing date of the instant application, and is co-authored by Mary Vernon. Both Eager and Vernon are inventors of the present application. Accordingly, the Eager reference is disqualified as prior art under 35 USC 103(a).

Withdrawal of the rejection of claim 6 is therefore respectfully requested.

2. Claims 2-5, 7, 9

Claims 2-5, 7, and 9 are rejected under 35 USC 103(a) as being unpatentable over Nussbaumer in view of Birk. Applicant cites the allowability of claim 1 as providing a sufficient basis for the allowance of corresponding dependent claims 2-5, 7, and 9. Withdrawal of the rejection of these claims is therefore respectfully requested.

IV. Claim 8

Applicant has not identified any substantive rejection of claim 8 in the Office Action. Nevertheless, claim 8 depends from allowable claim 7, and is therefore also allowable over the cited prior art. Formal allowance of claim 8 is therefore respectfully requested.

V. Other Claim Amendments

Claims 1 and 14 have been amended for the purposes of proper punctuation, and claim 12 has been amended for the purposes of consistency throughout the claim.

Claim 11 has been amended to recite the proper spelling of "suffix".

Claim 19 has been amended to define the claim term $D_{regional}$ in a manner consistent with that disclosed at Table 2 (Page 17) of the present application.

Applicant asserts that these amendments were made for the purposes of form and clarity only, and were not made for reasons related to patentability or to overcome any outstanding rejection.

VI. Allowable Subject Matter

Applicant notes with appreciation that claims 18 and 19 were found to contain allowable subject matter. Claim 14 has been shown to be allowable over the cited prior art, thereby providing sufficient basis for the allowability of corresponding dependent claims 18 and 19. Formal allowance of claims 18-19 is therefore respectfully requested.

VII. New Claims

As noted above, Applicant has added new claim 20 to the present application. Claim 20 depends from claim 12 and recites that the prefix and suffix are determined so as to reduce costs associated with transmitting the media file to the plurality of clients. Claim 12 is allowable for depending from an allowable claim. Formal allowance of new claim 20 is therefore respectfully requested.

VIII. Telephone Interview

Applicant had spoken briefly with Examiner Marc D. Thompson regarding this application. Applicant appreciates Examiner Thompson's remarks that if a Notice of Allowance is not forthcoming, the Examiner will conduct a telephone interview with Applicant prior to issuing a subsequent Office Action.

Applicant therefore requests that the Examiner contact the undersigned if a Notice of Allowance will not be forthcoming in light of this communication.

IX. Conclusion

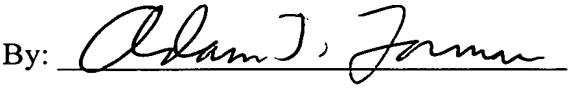
Applicant therefore respectfully asserts that all rejections and objections cited by the Examiner have been overcome. Accordingly, the application is in condition for allowance, and a Notice of Allowance is earnestly solicited. The Examiner is invited to contact the

undersigned at the telephone number appearing below if such would advance the prosecution of this application.

The Commissioner is hereby authorized to deduct the $950 fee for a three-month extension of time, along with any additional fees arising as a result of this Amendment or any other communication, from Deposit Account No. 17-0055.

Respectfully submitted,

Derek L. Eager, et. al.

By: 

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